

R E M A R K S

New claims 25, 26, 30, 31, 35 and 36 are supported in the specification on page 9, lines 1 to 4.

New claims 29, 34 and 39 are supported on page 4, lines 4 to 9 of the specification.

New claims 27, 28, 32, 33, 37 and 38 are supported in the specification on page 4, lines 3 to 5.

Claims 1 to 4 and 14 to 16 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 3 to 12 of USP 6,720,375 for the reasons set forth in Item No. 6 at the top of page 3 of the Office Action.

Transmitted herewith is a Terminal Disclaimer which identifies USP 6,720,375. Withdrawal of the double patenting rejection is therefore respectfully requested.

The presently claimed invention is directed to the following embodiments:

(i) An optical component in combination with an adhesive composition, wherein the adhesive composition being a crosslinked product of components which comprise:

(A) a copolymer of a (meth)acrylic ester having a weight-average molecular weight of 500,000 to 2,000,000, the weight-average molecular weight being the weight-average molecular weight of a corresponding polystyrene obtained in accordance with gel permeation chromatography and

(B) a crosslinking agent comprising an adduct of a polyisocyanate compound which comprises (a) isocyanate difunctional adducts of a diisocyanate compound with a diol and (b) adducts of a diisocyanate compound with a polyhydric alcohol, and having an isocyanate functionality of three or greater, in amounts such that a ratio of the amounts by weight of the difunctional adducts (a) and the adducts (b) is 95:5 to 10:90,

wherein the copolymer (A) contains portions capable of reacting with the crosslinking agent (B), and wherein the crosslinking agent (B) is in an amount of 0.001 to 50 parts by weight per 100 parts by weight of the copolymer (A) (see applicants' claim 1).

(ii) An adhesive sheet comprising a substrate sheet and a layer which comprises an adhesive composition which is disposed

on at least one face of the substrate sheet, the adhesive composition being a crosslinked product of components which comprise:

(A) a copolymer of a (meth)acrylic ester having a weight-average molecular weight of 500,000 to 2,000,000, the weight-average molecular weight being the weight-average molecular weight of a corresponding polystyrene obtained in accordance with gel permeation chromatography and

(B) a crosslinking agent comprising an adduct of a polyisocyanate compound which comprises (a) isocyanate difunctional adducts of a diisocyanate compound with a diol and (b) adducts of a diisocyanate compound with a polyhydric alcohol, and having an isocyanate functionality of three or greater, in amounts such that a ratio of the amounts by weight of the difunctional adducts (a) and the adducts (b) is 95:5 to 10:90,

wherein the copolymer (A) contains portions capable of reacting with the crosslinking agent (B), and wherein the crosslinking agent (B) is in an amount of 0.001 to 50 parts by weight per 100 parts by weight of the copolymer (A), wherein

the diisocyanate compound which forms the adduct (a) or the adducts (b) is selected from the group consisting of tolylene diisocyanate, diphenylmethane diisocyanate, xylylene diisocyanate, hexamethylene diisocyanate, isophorone diisocyanate and hydrogenated diphenylmethane diisocyanate; the diol which forms adducts (a) is selected from the group consisting of ethylene glycol, 1,3-propanediol, 1,4-butanediol, 1,6-hexanediol, polyethylene glycol, polypropylene glycol and polytetramethylene glycol; the polyhydric alcohol which forms the adducts (b) is selected from the group consisting of glycerol, trimethylolpropane, trimethylolethane, pentaerythritol and dimers thereof (see applicants' claim 2).

(iii) An adhesive optical component comprising an optical component in a form of a sheet and a layer which comprises an adhesive composition which is disposed on at least one face of the optical component, the adhesive composition being a crosslinked product of components which comprises:

(A) a copolymer of a (meth)acrylic ester having a weight-average molecular weight of 500,000 to 2,000,000, the weight-average molecular weight being the weight-average molecular

weight of a corresponding polystyrene obtained in accordance with gel permeation chromatography and

(B) a crosslinking agent comprising an adduct of a polyisocyanate compound which comprises (a) isocyanate difunctional adducts of a diisocyanate compound with a diol and (b) adducts of a diisocyanate compound with a polyhydric alcohol, and having an isocyanate functionality of three or greater, in amounts such that a ratio of the amounts by weight of the difunctional adducts (a) and the adducts (b) is 95:5 to 10:90,

wherein the copolymer (A) contains portions capable of reacting with the crosslinking agent (B), and wherein the crosslinking agent (B) is in an amount of 0.001 to 50 parts by weight per 100 parts by weight of the copolymer (A) (see applicants' claim 3).

Claims 1 to 4 and 14 to 16 were rejected under 35 USC 102 as being anticipated by Sakurai et al. JP 9-137143 for the reasons stated in Item No. 8 on pages 3 and 4 of the Office Action.

Enclosed is an English-language computer translation of JP 9-137143 obtained from the JPO website, which contains

handwritten corrections and comments in paragraphs [0001] and [0005] made by the applicants. Also enclosed is an English-language translation of paragraph [0005] of JP 9-137143 that was provided by the applicants.

JP 9-137143 discloses a binder constituent for optic instruments characterized by blending a plasticizer and a crosslinking agent with an acrylic resin system binder (see claim 1 and Abstract). JP 9-137143 is substantially different from the presently claimed invention with respect to the following points:

(1) The binder composition of JP 9-137143 contains a plasticizer as an essential component. The problem in using a plasticizer is set forth in the paragraph bridging pages 3 and 4 of the present specification. One of the objects of the present invention is to provide an adhesive composition which exhibits excellent stress relaxation without using a plasticizer, and which can prevent staining of the adherent and can be advantageously used for optical components (see page 4 of the present specification, SUMMARY OF THE INVENTION, first paragraph). An example which shows that the use of a plasticizer in an adhesive causes the staining of glass is seen in

Comparative Example 2 on page 26 of the present specification and Table 1 (on page 27 of the present specification).

(2) JP 9-137143 discloses some examples of isocyanate compounds in column 5, lines 11 to 19 of the Japanese specification. All the compounds exemplified there are as follows: tolylene diisocyanate, hydrogenated tolylene diisocyanate, a tolylene diisocyanate addition product of trimethylol propane, a xylylene diisocyanate addition product of trimethylol propane, triphenylmethane triisocyanate, methylene-bis (4-phenylmethane) triisocyanate, isophorone diisocyanate or others and blocked compounds thereof by ketoxime or phenol.

As far as the above exemplification of isocyanate compounds is concerned, JP 9-137143 does not disclose any isocyanate difunctional adducts to say nothing of the combination of isocyanate difunctional adducts, with adducts having an isocyanate functionality of three or more as recited in applicants' claims.

It is therefore respectfully submitted that applicants' claims patentably distinguish over JP 9-137143. Withdrawal of the rejection under 35 USC 102 is therefore respectfully requested.

In view of the cancellation of withdrawn claims 5 to 13 and 17 to 24, submitted concomitantly herewith is an AMENDMENT DELETING CORRECTLY NAMED ORIGINAL PERSONS WHO ARE NOT INVENTORS OF INVENTION NOW BEING CLAIMED (37 CFR 1.48(b)) to delete Keiji SATO and Takashi SUZUKI as inventors.

Enclosed herewith is a check for \$36 in payment of two additional claims.

Reconsideration is requested. Allowance is solicited.

PATENT ABSTRACTS OF JAPAN

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(54) OPTICAL TACKY ADHESIVE COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To prepare an optical tacky adhesive compsn. which can prevent light leakage by incorporating a plasticizer and a crosslinking agent into a tacky adhesive based on an acrylic resin.

SOLUTION: A crosslinking agent, such as a polyisocyanate compd., is added in an amt. of 0.001 to 10 pts.wt. (hereinafter referred to as 'pts.') to 100 pts. copolymer, having a wt.-average mol.wt. of 1,200,000 to 1,500,000, prepd by copolymerizing about 50 to 98wt.% (hereinafter referred to as '%') alkyl (meth) acrylate with about 2 to 50% other polymerizable monomer, such as a carboxyl- contg. monomer, a hydroxyl- contg. monomer, or an amide- contg. monomer, to prepare an acrylic resin (A). Similarly, a crosslinking agent is added to a copolymer having a wt.-average mol.wt. of 500,000 to 900,000 to prepare an acrylic resin (B). Subsequently, the acrylic resin (A) and the acrylic resin (B) are mixed together in a wt. ratio of (6:4) to (4:6), and a predetermined amt. of a plasticizer, such as a phthalic ester, is added thereto, followed by kneading. A solvent, such as methyl ethyl ketone, is added to dilute the kneaded product so that the nonvolatile content is about 10 to 20%, thus preparing an optical tacky adhesive compsn. based on an acrylic resin.

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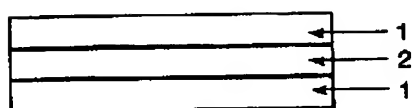
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Drawing selection drawing 1 ▼



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CLAIMS

[Claim(s)]

[Claim 1] The binder constituent for optics characterized by blending a plasticizer and a cross linking agent with an acrylic resin system binder.

[Claim 2] The binder constituent for optics of claim 1 which is the mixture of the acrylic resin which has the weight average molecular weight from which an acrylic resin system binder differs.

[Claim 3] The binder constituent for optics of claim 2 whose mixture of the acrylic resin which has different weight average molecular weight is the mixture of the acrylic resin of weight average molecular weight 1,200,000–1,600,000, and the acrylic resin of weight average molecular weight 500,000–900,000.

[Claim 4] The binder constituent for optics of claim 1 whose one component of acrylic resin is the copolymer of the monomer which has an amide group in a molecule thru/or any 1 term of 3.

[Claim 5] The phase contrast plate which has the layer of the binder constituent for optics of claim 1 thru/or any 1 term of 4.

[Claim 6] The polarizing plate which has the layer of the binder constituent for optics of claim 1 thru/or any 1 term of 4.

[Claim 7] MD (Machinery Direction) The tensile strength of a direction is 2 15kg/mm. It is TD (Transverse Direction) above. The tensile strength of a direction is 2 12.5kg/mm. Polarizing plate of claim 6 which uses as a base material the cellulose system film which it is above.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

based [The field of the invention to which invention belongs] This invention relates to a useful *adhesive composition* binder constituent especially for the optics of pasting up the polarizing plate or phase contrast film which has a cellulose system film in a protective layer, and a liquid crystal cell. ~~Furthermore~~, it is related with the binder constituent which controls the optical leakage and optical nonuniformity in the cross Nicol's prism condition after durability test ~~in detail~~.

[0002]

more particularly, [Description of the Prior Art] A liquid crystal display component is a component which encloses liquid crystal between the electrode bases of two sheets, uses the property of liquid crystal that optical property changes by impressing an electrical potential difference to the electrode of an electrode base, and obtains a desired display pattern. The thickness of a component can choose a display pattern freely thinly, and such a liquid crystal display component has very low power consumption, a low-battery drive is possible for it, and since the direct drive of CMOS-IC is made, it is used as display devices for almost all displays, such as a calculator, an air-conditioner, and telephone. For example, a twist nematic mold liquid crystal display component is a component which equips the outside of said vertical electrode base of two sheets with the polarizing plate, it is made to attach and drive a switching element (TFT) by each dot of this component, and the display object combined with the color filter is used for the liquid crystal television or the liquid crystal movie.

[0003] Most polarizing plates used for this liquid crystal display component make a polyvinyl alcohol (PVA) film adsorb or distribute iodine or dichroic coloring matter, and it is using the polarizing element film obtained by extending a film in the fixed direction. This polarizing element film is very thin film, and moreover, to an extension shaft and the hauling force of the direction of a right angle, since it is weak, generally lamination ***** of it is carried out at a base material. Generally cellulose system films, such as a cellulose triacetate, cellulose butyrate, and cellulose acetate, are used for this base material.

[0004]

[Problem(s) to be Solved by the Invention] However, the polarizing plate which used the conventional cellulose system film for the base material producing a gap of an optical axis in a reliability trial, and causing variation in the contrast within a field in the state of a black display by gap of the optical axis of the base material corresponding to a vertical electrode substrate side was found out. The purpose of this invention is to offer the polarizing plate which controlled the optical leakage by the cross Nicol's prism condition after a reliability trial. Specifically In the reliability trial of a polarizing plate, the optical leakage based on a gap of an optical axis does not occur, but especially by gap of the optical axis of the base material corresponding to a vertical electrode substrate side The liquid crystal display component which has the polarizing plate stuck on the glass electrode through the adhesive layer in the state of the black display is making it optical leakage not occur after a reliability trial.

[0005]

[Means for Solving the Problem] ~~this invention person-etc~~ completed this invention, as a result of repeating examination wholeheartedly for the optical leakage prevention produced in the state of a black display after durability test about the liquid crystal display component which has the polarizing plate stuck on the glass electrode through the adhesive layer. That is, this invention is a binder constituent for optics characterized by blending a plasticizer and a cross linking agent with (1) acrylic-resin system

binder.

(2) The binder constituent for optics of (1) which is the mixture of the acrylic resin which has the weight average molecular weight from which an acrylic resin system binder differs, (3) The binder constituent for optics of (2) whose mixture of the acrylic resin which has different weight average molecular weight is the mixture of the acrylic resin of weight average molecular weight 1,200,000–1,600,000, and the acrylic resin of weight average molecular weight 500,000–900,000, (4) (1) thru/or (3) binder constituents for optics whose one component of acrylic resin is the copolymer of the monomer which has an amide group in a molecule, The phase contrast plate which has the layer of the binder constituent for optics of (5), (1), or (4), The polarizing plate which has the layer of the binder constituent for optics of (6), (1), or (4), (6) MD (Machinery Direction) The tensile strength of a direction is 2 15kg/mm. Above, TD (Transverse Direction) The tensile strength of a direction is 2 12.5kg/mm. It is related with the polarizing plate of (6) which uses as a base material the cellulose system film which it is above.

[0006]

[The mode of implementation of invention] As an acrylic resin system binder used here, the copolymer of acrylic-acid alkyl ester and other polymerization nature monomers is raised, for example (meta). (Meta) As acrylic-acid alkyl ester, a methyl acrylate, an ethyl acrylate (meta), acrylic-acid (meta) isopropyl, acrylic-acid (meta) n-butyl, acrylic-acid (meta) t-butyl, acrylic-acid (meta) dodecyl, etc. are raised, for example (meta). these (meta) acrylic-acid alkyl ester — one sort — or two or more sorts may be used. As other polymerization nature monomers, three sorts of polymerization nature monomers as follows, i.e., the polymerization nature monomer which has a hydroxyl group in the polymerization nature monomer which has a carboxyl group in a molecule, or a molecule, the polymerization nature monomer which has an amide group in a molecule are raised, for example. The polymerization nature monomer which has a hydroxyl group in the polymerization nature monomer which has a carboxyl group in a molecule, or a molecule is used when foaming and exfoliation under an elevated temperature or highly humid heat (reliability trial) need to be pressed down, and the polymerization nature monomer which has an amide group in a molecule is used when degradation by the acid in a reliability trial needs to be pressed down. Two or more sorts of other polymerization nature monomers of these are usually used. Moreover, polymerization nature monomers other than the three above-mentioned sorts of polymerization nature monomers, the functional-group polymerization nature monomer which is not contained [of styrene etc.], vinyl acetate, acrylonitrile, etc., are also further used together as an arbitration component if needed.

[0007] As a polymerization nature monomer which has a carboxyl group, an acrylic acid, a methacrylic acid, a maleic acid, an itaconic acid, etc. are raised into a molecule, for example. As a polymerization nature monomer which has a hydroxyl group in a molecule For example, 2-hydroxyethyl acrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl acrylate, 2-hydroxypropyl methacrylate, Hydroxy (carbon numbers 1–5) alkyl (meta) acrylate, such as 3-chloro-2-hydroxypropyl acrylate and 3-chloro-2-hydroxypropyl methacrylate, Diethylene-glycol (meta) acrylate, such as diethylene-glycol monoacrylate and diethylene-glycol mono-methacrylate, etc. is raised, and glycidyl methacrylate, allyl glycidyl ether, etc. are raised further. As a polymerization nature monomer which has an amide group, acrylamide system monomers, such as N,N-dimethylaminopropyl acrylamide, N,N-dimethylacrylamide, N, and N-diethyl acrylamide, acryloyl morpholine, N-isopropyl acrylamide, N-methylol acrylamide, and acrylamide, are raised into a molecule, for example.

[0008] (Meta) Acrylic-acid (meta) alkyl ester is [other polymerization nature monomers of the operating rate of acrylic-acid alkyl ester and other polymerization nature monomers] about 30 – 5 % of the weight preferably 50 to 2% of the weight 70 to 95% of the weight 50 to 98% of the weight. When using the polymerization nature monomer which has an amide group in a molecule 0.5 to 5% of the weight preferably 0.1 to 10% of the weight when using the polymerization nature monomer which has a hydroxyl group in a molecule one to 7% of the weight preferably 0.5 to 10% of the weight when using the polymerization nature monomer which has a carboxyl group into other polymerization nature monomers and a molecule, it is about 3 – 15 % of the weight preferably one to 20% of the weight. Moreover, the polymerization nature monomer used as an arbitration component is about 0 – 10 % of the weight preferably zero to 20% of the weight. Moreover, when using together the polymerization nature monomer which has a carboxyl group in a molecule, and the polymerization nature monomer which has an amide group in a molecule, when the endurance and adhesion in high-humidity/temperature are taken into consideration, about 3 to 5 times of the number of the carboxyl groups of the whole resin are desirable

[the number of the amide groups of the polymerization nature monomer component which has an amide group in a molecule].

[0009] The acrylic resin system binder used by this invention dissolves the monomer to be used in an organic solvent, and can manufacture it easily by carrying out radical copolymerization by the general common knowledge approach. As an organic solvent, ketones, such as fatty alcohol, such as ester, such as aromatic hydrocarbon, such as toluene and a xylene, ethyl acetate, and butyl acetate, n-propyl alcohol, and isopropyl alcohol, a methyl ethyl ketone, and methyl isobutyl ketone, are raised, for example. As a polymerization catalyst, azobisisobutyronitril, benzoyl peroxide, di-t-butyl peroxide, a cumene hydroperoxide, etc. are raised, for example.

[0010] as the acrylic resin system binder used by this invention — weight average molecular weight — 1,200,000–1,600,000 — 500,000–900,000, and the thing that mixed two sorts of binders with the thing of about 600,000 to 800,000 low molecular weight still more preferably have the thing of the about 1,300,000 to 1,500,000 amount of macromolecules, and still more preferably desirable weight average molecular weight. the mixed rate — the thing of the amount of macromolecules — 8 – 3 weight section — receiving — the thing of low molecular weight — 3 – 7 weight section — 4 – 6 weight section extent is [former] preferably good in the latter to 6 – 4 weight section. Moreover, in order to prevent degradation by the acid in the reliability trial of the triacetate which is the base material of a phase contrast plate or a polarizing plate One of the thing of the amount of macromolecules, and the things of low molecular weight or both sides, the desirable thing of high molecular weight, If it is desirable to use the polymerization nature monomer which is alike and has an amide group in a molecule as a component of other polymerization nature monomers and foaming and exfoliation in a reliability trial are also further taken into consideration It is desirable to use together three persons of a polymerization nature monomer who have an amide group in the polymerization nature monomer which has a carboxyl group in a molecule, the polymerization nature monomer which has a hydroxyl group in a molecule, and a molecule.

[0011] As a plasticizer used for the binder constituent of this invention, triphenyl phosphate is desirable as the thing of a phthalic ester system, for example, dibutyl phthalate, diheptyl phthalate, di-n-octyl phthalate, phthalic-acid G 2-ethylhexyl, phthalic acid diisononyl ester, dioctyl-phthalate DESHIRU, phthalic acid benzyl butyl ester, and a phosphoric ester system. Furthermore, the field of dependability to phthalic-acid G 2-ethylhexyl is preferably useful. Moreover, the plasticizer of others in ordinary use may be used to an acrylic resin copolymer system binder. The amount of the plasticizer used has about 10 – 30 preferably good % of the weight one to 40% of the weight to an acrylic resin system binder. In the case of the plasticizer of a phthalic ester system or a triphenyl phosphate system, 20 – 30 % of the weight is more desirable.

[0012] If it is a thing in ordinary use to an acrylic resin system binder as a cross linking agent used for this invention, there will be especially no limit, for example, melamine compounds, such as the poly isocyanate compounds, such as aliphatic series diisocyanate and aromatic series diisocyanate, a butyl ether-ized styrol melamine, and trimethylolmelamine, an epoxy resin system compound, a metal salt, etc. will be used. the amount of the cross linking agent used — per [0.001] acrylic resin system binder 100 weight section – 10 weight sections — desirable — 0.005 – 5 weight section — 0.01 – 5 weight section extent is still more preferably good.

[0013] Here, as an isocyanate compound, these ketoxime block objects, such as tolylene diisocyanate, hydrogenation tolylene diisocyanate, a tolylene diisocyanate addition product of trimethylol propane, a xylylene diisocyanate addition product of trimethylol propane, triphenylmethane triisocyanate, methylenebis (4-phenylmethane) tri-isocyanate, and isophorone diisocyanate, or a phenol block object is raised, for example. as an epoxy resin system compound — the epoxy resin of for example, a bisphenol A and an epichlorohydrin mold, ethylene glycol diglycidyl ether, polyethylene glycol diglycidyl ether, 1, 6-hexanediol diglycidyl ether, trimethylolpropane triglycidyl ether, diglycidyl aniline, a diglycidyl amine, N and N, N', and N' – tetraglycidyl ether-meta xylene diamine, 1, and 3-screw (N and N'-diglycidyl aminoethyl) cyclohexane etc. is raised. As a metal salt, a cupric chloride, an aluminum chloride, a ferric chloride, a stannic chloride, a zinc chloride, a nickel chloride, a magnesium chloride, an aluminum sulfate, copper acetate, chromium acetate, etc. are given to salts, such as a chloride of polyvalent metal, such as aluminum, iron, copper, zinc, tin, titanium, nickel, antimony, magnesium, vanadium, and chromium, a bromide, a nitrate, a sulfate, and acetate, and a concrete target, for example.

[0014] What is necessary is just to mix an acrylic resin system binder, a plasticizer, and a cross linking

agent to homogeneity, in order to manufacture the binder constituent for optics of this invention. Moreover, when the ease of spreading to a base material is taken into consideration, it is desirable to dilute with the solvent usually generally used to dilution of acrylic resin system binders, such as a methyl ethyl ketone (MEK), toluene, and ethyl acetate, so that a nonvolatile matter may become 15 – 20%.

[0015] The polarizing plate of this invention carries out laminating adhesion (adhesion) at least of one side of the polarizing element film (polarization film) with the base material which consists of cellulose films, such as for example, cellulose-triacetate film, and is created by being 20–25 micrometers in thickness preferably, and forming 15–30 micrometers of layers of the binder constituent for optics of this invention on this base material. The layer of the binder constituent for optics of this invention may cover with the exfoliation film further. Although not limited, especially the polarization film used here makes a PVA film adsorb or distribute iodine or dichroic coloring matter, and esterifying in a boric-acid water solution, about 3 to 5 times, stoving can be extended and carried out to 1 shaft orientations, and it can be obtained to them, for example. As dichroic coloring matter, it can be chosen out of acid dye or direct dye as arbitration, for example, and azo system coloring matter, anthraquinone system coloring matter, methine system coloring matter, cyanine system coloring matter, etc. are mentioned. Moreover, as an adhesion (adhesion) agent used for laminating adhesion (adhesion), the adhesion (adhesion) nature resin which can be hardened by polymerization reactions, such as solvent type adhesives (adhesion), such as an epoxy system with good transparency, a polyester system, and vinyl acetate, or acrylic polymerization resin, and urethane resin, for example is mentioned.

[0016] As a base material of the polarizing element film used here, the tensile strength of the direction of MD is 2 15kg/mm, for example. The tensile strength of 2 and the direction of TD is 2 12.5kg/mm 15–20kg/mm preferably above. It is 2 12.5–15kg/mm preferably above. A cellulose system film is raised. As the material, a cellulose triacetate is mentioned, for example. This cellulose system film is manufactured by JP,5–185445,A by the solution film production approach of a publication. Although especially the thickness of the cellulose system film used here is not limited, it is about 50–100 micrometers still more preferably 50–200 micrometers preferably.

[0017] As phase contrast film which can be used in order to manufacture the phase contrast plate of this invention, although the polyvinyl alcohol (PVA) system phase contrast film, the polycarbonate system phase contrast film, the polyarylate system phase contrast film, the polysulfone system phase contrast film, etc. are raised, for example, it is not limited especially. In the case of for example, a PVA system phase contrast plate, the process carries out laminating adhesion (adhesion) at least of one side of the well-known phase contrast film (phase contrast film) which consists of PVA film with the base material which consists of cellulose films, such as for example, cellulose-triacetate film, and is created by being 20–25 micrometers in thickness preferably, and forming 15–30 micrometers of layers of the binder constituent for optics of ***** on this base material. The layer of the binder constituent for optics of this invention may cover with the exfoliation film further. Esterifying a PVA film in a boric-acid water solution, about 1.1 to 1.2 times, stoving can be extended and carried out to 1 shaft orientations, and the phase contrast film used here can be obtained to them. Moreover, as an adhesion (adhesion) agent used for laminating adhesion (adhesion), the adhesion (adhesion) nature resin which can be hardened by polymerization reactions, such as solvent type adhesives (adhesion), such as an epoxy system with good transparency, a polyester system, and vinyl acetate, or acrylic polymerization resin, and urethane resin, for example is mentioned.

[0018] As a base material of the phase contrast film used here, the tensile strength of the direction of MD is 2 15kg/mm, for example. The tensile strength of 2 and the direction of TD is 2 12.5kg/mm 15–20kg/mm preferably above. It is 2 12.5–15kg/mm preferably above. A cellulose system film is raised. As the material, a cellulose triacetate is mentioned, for example. This cellulose system film is manufactured by JP,5–185445,A by the solution film production approach of a publication. Although especially the thickness of the cellulose system film used here is not limited, it is about 50–100 micrometers still more preferably 50–200 micrometers preferably.

[0019] The phase contrast plate of this invention is stuck on the binder side of the polarizing plate of this invention, and is used as a elliptically-polarized-light plate. By using the phase contrast plate of this invention, the imperfect alignment of the cellulose system film which is the base material of a polarizing plate can be prevented, and generating of color nonuniformity can be canceled.

[0020]

[Example] Although an example and the example of a comparison are given and this invention is

hereafter explained further to a detail, this invention is not limited to the following examples, unless the summary is exceeded.

[0021] The tensile strength of the direction of MD the both sides of the PVA system polarization film (what extended the 99.8-mol % PVA film 4 times, and obtained it average degree of polymerization 1700 and whenever [average saponification]) of 25 micrometers of example 1 thickness mm 17.1kg /2, The tensile strength of the direction of TD is 2 13.1kg/mm. The laminating was carried out with the triacetic-acid cellulose film (80 micrometers of thickness, trade name TD80U (Fuji Photo Film make)), the polarizing plate as shown in drawing 1 was created, and it prepared as a base material.

[0022] Two kinds of following acrylic resin was prepared.

[0023] Acrylic resin (A) was obtained by the following approach. That is, the trimethylol propane (one mol) addition product (cross linking agent) 3 weight section of tolylene diisocyanate (three mols) and the gamma-glycidoxy propyl silane 1 weight section were blended with the acrylic resin system binder (resinous principle: acrylic-acid n-butyl / 2-hydroxyethyl acrylate / acrylic-acid / N,N-dimethylacrylamide =80 % of the weight / 1-% of the weight / 3-% of the weight / 16% of the weight of copolymerization object) 100 weight section of weight average molecular weight 1,400,000, and amount of macromolecules type acrylic resin (A) was obtained.

[0024] Acrylic resin (B) was obtained by the following approach. The trimethylol propane (one mol) addition product (cross linking agent) 3 weight section of tolylene diisocyanate (three mols) and the gamma-glycidoxy propyl silane 1 weight section were blended with the acrylic resin system binder (resinous principle: n-butyl acrylate / methyl acrylate / 2-hydroxyethyl acrylate =80 % of the weight / 18-% of the weight / 2% of the weight of copolymerization object) 100 weight section of weight average molecular weight 700,000, and low-molecular-weight type acrylic resin (B) was obtained.

[0025] After blending (B) with the above and acrylic resin (A) at a rate of 1 to 1 and carrying out 3 weight sections addition combination of the dioctyl phthalate (plasticizer), it diluted with MEK so that a nonvolatile matter might become 15%, and considered as the binder constituent of this invention. The laminating was carried out to the triacetic-acid cellulose film side of the polyvinyl alcohol system polarizing plate (the average degree of polymerization 1700 of a polyvinyl alcohol system polarizability film, whenever [average saponification] 99.5-mol extension [% and 5 time]) which applies so that the thickness after drying the binder constituent of this this invention on an exfoliation film may be set to 20-30 micrometers, and makes a triacetic-acid cellulose film a protective layer after desiccation, and the polarizing plate which presses with a roller and has the binder constituent layer of this invention was created.

[0026] The polarizing plate which the dioctyl phthalate of the plasticizer in the binder constituent of example 2 example 1 was replaced with triphenyl phosphate, and also has the binder constituent layer of this invention like an example 1 was created.

[0027] Example of comparison 1 acrylic resin (C) was obtained by the following approach. The acrylic resin (C) of the amount type of macromolecules which blends the trimethylol propane (one mol) addition product 3 weight section of tolylene diisocyanate (three mols) and the gamma-glycidoxy propyl silane 1 weight section with the acrylic resin system binder (resinous principle: n-butyl acrylate / acrylic-acid / 2-hydroxyethyl acrylate =94.5 % of the weight / 5-% of the weight / 0.5% of the weight of copolymerization object) 100 weight section of weight average molecular weight 1,400,000, and has an acid for the comparison to this invention was obtained. Hereafter, the polarizing plate which has a binder constituent layer was created like the example 1, without adding a plasticizer.

[0028] The polarizing plate which acrylic resin (A) was used with the binder constituent of example of comparison 2 example 1, without adding a cross linking agent and a plasticizer, and also has a binder constituent layer by the same approach as an example 1 was created.

[0029] The example of trial 1 absorption shaft was made into 45 degrees (or 135 degrees), and after cutting into 120mmx90mm size the polarizing plate created in examples 1-2 and the example 1 of a comparison and exfoliating an exfoliation film, it was left in the glass plate for 24 hours under the condition (lamination, and every two-sheet 100 degrees C) or the condition of 60 degrees C / 95%RH (it is equivalent to a dependability test condition). Subsequently, it considered as the cross Nicol's prism condition, brightness % (C1, C2) in the measuring point (it is 1cm inside section from the center section within A:side and the center of B:long side) shown in drawing 2 was measured, and the brightness ratio (C2/C1) was computed. (10) and (20) express a polarizing plate among drawing 2 , respectively.

Brightness % is a value when setting the brightness of the light source to 100, and means that there is

so little optical leakage that the value is small. Moreover, a brightness ratio means that there is so little variation in the contrast within a liquid crystal display side that the value is small. A result is shown in Table 1.

[0030]

[Table 1]

table 1 100 degree-Cx 24 hours 60 degrees C / 90%RHx 24 hours C2 C1 A brightness ratio C2 C1
 Brightness ratio example 1 0.0521 0.0216 2.41 0.0224 0.0142 1.58 examples 2 0.0512 0.0208 2.46 0.0231 0.0152 Example 1 of 1.52 comparisons 0.0779 0.0221 3.52 0.0739 0.0184 4.02 (small foaming is seen)
 Example 2 of a comparison 0.1271 0.0239 5.43 0.1100 0.0192 5.72 [0031] It applies so that the thickness after drying the binder constituent of this invention obtained in the example 3 example 1 on an exfoliation film may be set to 20–30 micrometers. After desiccation, the polyvinyl alcohol (PVA) system phase contrast plate (whenever [the average degree of polymerization 1700 of a PVA system phase contrast film, and / average saponification] — 99.5–mol % —) which makes a triacetic–acid cellulose film a protective layer The laminating was carried out to the triacetic–acid with 1.1 time extension and a phase contrast value [of 450nm] cellulose film side, and the phase contrast plate which presses with a roller and has the binder constituent layer of this invention was created.

[0032] The PVA system phase contrast plate which applies so that the thickness after drying the binder constituent of this invention on the polarizing plate of this invention obtained in the example of trial 2 example 1 may be set to 20–30 micrometers, and has 15 degrees and the binder constituent layer of an example 3 for a polarizing plate after desiccation was stuck by whenever [75–degree axial–angle], and the elliptically–polarized–light plate was created. After cutting this thing into 120mmx90mm size and exfoliating an exfoliation film, to a glass plate Lamination, the measuring point (the center section within A:side —) shown in 70–degree C ***** at drawing 4 after 48–hour neglect B: From the center of a long side, the hue (they are L*, a*, and the color specification method defined by b*:CIA1976) in 1cm inside section was measured with the luminance meter “TOPCON BM–5A” (TOPCON Make), and the hue change before and behind durability test was compared. In addition, what used the acrylic resin (C) used in the example 1 of a comparison as a binder constituent was made into the example 3 of a comparison. A result is shown in Table 2.

[0033]

[Table 2]

table 2 L* a* b* A/B A/B A/B Example 3 Before a trial 34.0/34.6 40.9/39.8 9.5/10.1 After a trial 34.0/34.6 40.6/40.2 9.7/10.2 Change 0/0 + 0.3/–0.4 –0.2/–0.1 Example 3 of a comparison with little color change Before a trial 33.1/33.8 39.7/40.4 3.8/7.8 After a trial 33.9/35.4 39.5/39.0 5.7/10.9 change – 0.8/–1.6 –0.2/+0.6 –1.9/–3.1 [0034] to which blueness becomes strong

[Effect of the Invention] By using the binder constituent of this invention, the variation in the contrast within the liquid crystal display side by optical leakage decreases, and display grace improves.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view of the configuration of a polarizing plate.

[Drawing 2] It is the explanatory view showing the measuring point (A and B) of the permeability in examples 1 and 2 and the examples 1 and 2 of a comparison.

[Drawing 3] It is the explanatory view of the configuration of a elliptically-polarized-light plate.

[Drawing 4] It is the explanatory view of measurement of the hue change by the luminance meter in an example 3 and the example 3 of a comparison.

[Description of Notations]

- 1: Base material
- 2: Polarizing element film
- 10: Polarizing plate
- 20: Polarizing plate
- 30: Phase contrast plate

[Translation done.]

* NOTICES *

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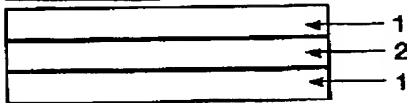
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

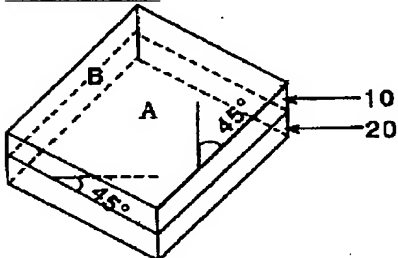
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



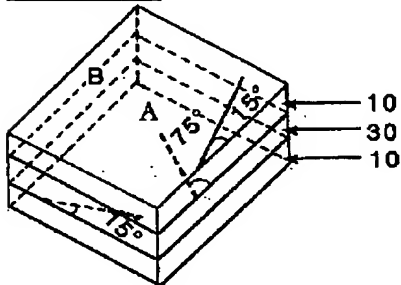
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]

Translation of paragraph 【0005】 of JP 09-137143

【0005】

【Means for solving the problem】 The present invention was completed as a result of extensive studies by the present inventors on a liquid crystal display element which has a polarizing plate attached to a glass electrode intervening an adhesive layer in preventing light leakage which occurs when the display element is in a condition of displaying black color after the durability test. The present invention relates to:

- (1) An adhesive composition for optical use which comprises acrylic resin based adhesive mixed with a plasticizer and a crosslinking agent;
- (2) The adhesive composition for optical use according to (1), wherein the acrylic resin based adhesive comprises a mixture of acrylic resins having different weight average molecular weight;
- (3) The adhesive composition for optical use according to (2), wherein the mixture of acrylic resins having different weight average molecular weight is a mixture of an acrylic resin having a weight average molecular weight in a range of 1,200,000 to 1,600,000 and an acrylic resin having a weight average molecular weight in a range of 500,000 to 900,000;
- (4) The adhesive composition for optical use according to any one of (1) to (3), wherein a component of the acrylic resin comprises a copolymer of a monomer having an amide group in the molecule;
- (5) A plate for phase differentiation which comprises a layer of the adhesive composition for optical use according to any one of (1) to (4);
- (6) A polarizing plate which comprises a layer of adhesive composition for optical use according to any one of (1) to (4); and
- (6) The polarizing plate according to (6) which comprises a substrate of cellulose based film, wherein said film has a tensile strength in MD (machinery direction) is 15kg/mm² or more and a tensile strength in TD (traverse direction) is 12.5 kg/mm² or more.

Note by the translator:

1. The last item numbered as (6) is obviously considered to be the error of (7).
2. "plate for phase differentiation" in (5) might be translated as "phase retardation plate". In the specification of the present application, "plate for phase differentiation" is used (please see page 21, line 16).